

An Observation of François' Langurs Using Caves at Mayanghe National Nature Reserve, Guizhou, China

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Abstract: The utilization of caves is a rather rare phenomenon in nonhuman primates, found almost exclusively in those members of the genus *Trachypitecus* that share a preference for forest on limestone (karst) hills in Vietnam and southern China. Here we report a new case of usage of caves as overnight sleeping shelters by François' or black langurs (*Trachypitecus francoisi*) at Mayanghe National Nature Reserve in Yanhe County, Guizhou Province, China. We tentatively address three possible hypotheses that may account for the use of caves in François' langurs at Mayanghe: shelter against climatic conditions, acquisition of minerals and protection from predators.

Key words: François' langurs; Guizhou Mayanghe National Nature Reserve; Cave utilization

贵州麻阳河自然保护区黑叶猴利用洞穴的观察

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摘要: 非人灵长类利用洞穴是非常稀少的现象。2003 年 11—12 月和 2004 年初在贵州麻阳河自然保护区观察到黑叶猴(*Trachypitecus francoisi*)有利用洞穴的现象。白天有二群(分别为 10 和 14 只)在栖息地附近活动, 黄昏前回到悬崖边几个喀斯特地形山洞中的一个洞。躲避风雨等不良的气候条件、获得矿物质、安全等因素可能是黑叶猴利用洞穴的原因。

关键词: 黑叶猴; 贵州麻阳河自然保护区; 洞穴利用

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The utilization of caves is a rather rare phenomenon in nonhuman primates. The only primates that are known to habitually shelter in caves are terrestrial baboons (Barrett et al, 2004) and those members of the arboreal genus *Trachypitecus* that share a preference for forest on limestone (karst) hills in Vietnam and southern China (e.g. Huang et al, 2003). Here we report a new case of cave usage as overnight sleeping shelters by François' langurs (*Trachypitecus francoisi*) at Mayanghe National Nature Reserve in Yanhe County, Guizhou Province, China. We tentatively address three possible hypotheses that may give

an explanation for the use of caves in François' langurs at Mayanghe: Shelter against climatic conditions, acquisition of minerals and protection from predators.

1 Field Site

François' langurs are little known leaf monkeys that show a scattered distribution across southwestern Guangxi, southwestern Guizhou, northeastern Guizhou and Chongqing Municipality in China as well as northern Vietnam. In 2003, the Mayanghe National Nature Reserve in Guizhou's Yanhe County was established in order to enhance the protection status of one of the

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largest remaining François' langur populations. This locality lies at the northernmost part of the taxon's distribution range at about 28° N latitude. Preliminary short-term observations of this isolated and so far unstudied population of François' langurs were carried out from 24 Nov. to 19 Dec. 2003, and during several days in May 2004. One group is now very well habituated due to occasional provisioning.

2 Results

The landscape within the boundaries of the nature reserve is severely degraded with extensive agricultural land and small patches of remaining broadleaf forest interspersed by karst hills.

One of the observed langur groups had 10 members, another 14. The langurs' daily activity budget is summarized as foraging in the vicinity of the roosting sites during the day and returning to one of several caves in the karst cliffs before dusk. A cave was occupied by only one group. Both the height above ground as well as the size and accessibility of the frequented caves varied considerably. Two types of caves were used: caves on the cliff faces and caves at the base of the hills. The largest cave (located at the bottom of the hills) had an entrance height of about 5 m, and the monkeys preferred to sleep in a niche at the top of the cave entrance.

3 Discussion

Among colobines, cave use has possibly only evolved in the those members of the genus *Trachypitecus* that inhabit limestone forests in Vietnam and southern China: white-headed langurs *T. leucocephalus* or *T. poliocephalus leucocephalus* (Huang et al, 2003) in China, Delacour langurs *T. delacouri* (Rogers et al, 2002) in Vietnam, and Cat Ba langurs *T. poliocephalus poliocephalus* (Nadler et al, 2003) in Vietnam. We briefly tackle three possible hypotheses that may account for the use of caves in François' langurs at Mayanghe. Shelter against climatic conditions such as temperature, wind and rain may be one reason for cave use (Huang et al, 2004; Nadler et al, 2003). Chacma

baboons seem to derive thermal benefits from using limestone caves with little temperature oscillations, especially in winter (Barrett et al, 2004). Temperatures at Mayanghe vary substantially across seasons, with temperatures dropping to the freezing point in winters and hot summers. In summer, langurs may seek refuge in cooler caves (compare with Huang et al, 2004); and in winter, caves may be visited to escape unfavourable weather conditions. We need data on frequency of use over the course of all seasons and precise meteorological data to ascertain whether the climate hypothesis has power to explain the behaviour.

Another possibility would be that Mayanghe's langurs seek caves as a source of minerals, which are a critical resource. François' langurs at Nonggang Nature Reserve in Guangxi (Zhou et al, submitted) and white-headed langurs at Fusui in Guangxi (Li et al, 2003) were observed on several occasions licking rock surfaces which may be related to mineral acquisition (for a similar observation in Tanzanian chimpanzees, see Nishida, 1980). Redmond & Shoshani (1987) listed three species of primates (among others black-and-white colobus *Colobus guereza*) that have been seen exploiting a cave at Mount Elgon, Uganda, possibly to consume mineral-rich rock in subterranean salt-licks. More detailed observations on the feeding behavior may reveal whether use of caves by Mayanghe langurs is related to mineral intake.

Cave use might also have evolved for safety reasons (Huang et al, 2004). Past predation pressure may have been a selective factor shaping the behaviour. Even though current predation threat seems minimal, birds of prey still pose a menace: immatures have been seen being attacked by them. Further work is needed to evaluate the reasons underlying cave use in François' langurs at Mayanghe.

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本刊编委赖仞研究员简介

赖 仞，男，1972 年 9 月出生。1991—1995 年，西南师范大学毕业获学士学位；1995—2001 年，中国科学院昆明动物研究所攻读博士，获博士学位；2002 年 3 月—2003 年 10 月，英国利物浦大学生物化学系，博士后；2003 年 11 月—2004 年 5 月，美国伯明翰阿拉巴马大学神经生物学系博士后；2004 年 7 月至今，中国科学院“百人计划”，在中国科学院昆明动物研究所任研究员，博士生导师，学科带头人，所学术委员会委员，所学位委员会委员，《动物学研究》编委。目前已经发表 50 多篇学术论文，包括 30 篇 SCI 研究论文；已经申请 26 项与抗菌肽相关的国家发明专利，11 项已经获得授权。

- 主要研究方向：
- 1) 抗菌肽及先天免疫：从两栖动物、蛇毒、昆虫及其他节肢动物发现了超过 100 种的抗菌多肽，并对其结构、功能和编码基因进行了较为深入的研究。
 - 2) 医学节肢动物及其携带的微生物病原体与其宿主相互作用的分子机制：主要研究蜱类生物及其携带的病原体微生物 – 莱姆病螺旋体与其宿主相互作用的分子机制，从分子角度阐释蜱类生物及其携带的病原体微生物对其宿主的免疫逃避机制。
 - 3) 天然活性多肽的分离、结构、功能、结构改造及先导药物分子发现：对一些具有显著生物活性的多肽，包括抗菌肽、抗病毒肽、抗肿瘤肽，胰岛素分泌促进肽以及蛋白酶抑制剂进行结构功能研究，对其结构进行修饰、改造，提高其生物活性和稳定性及生物利用度，指导新药设计。